

Page # 1

Name : Ibrar Ahmad

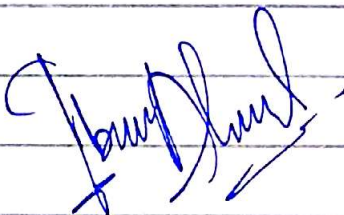
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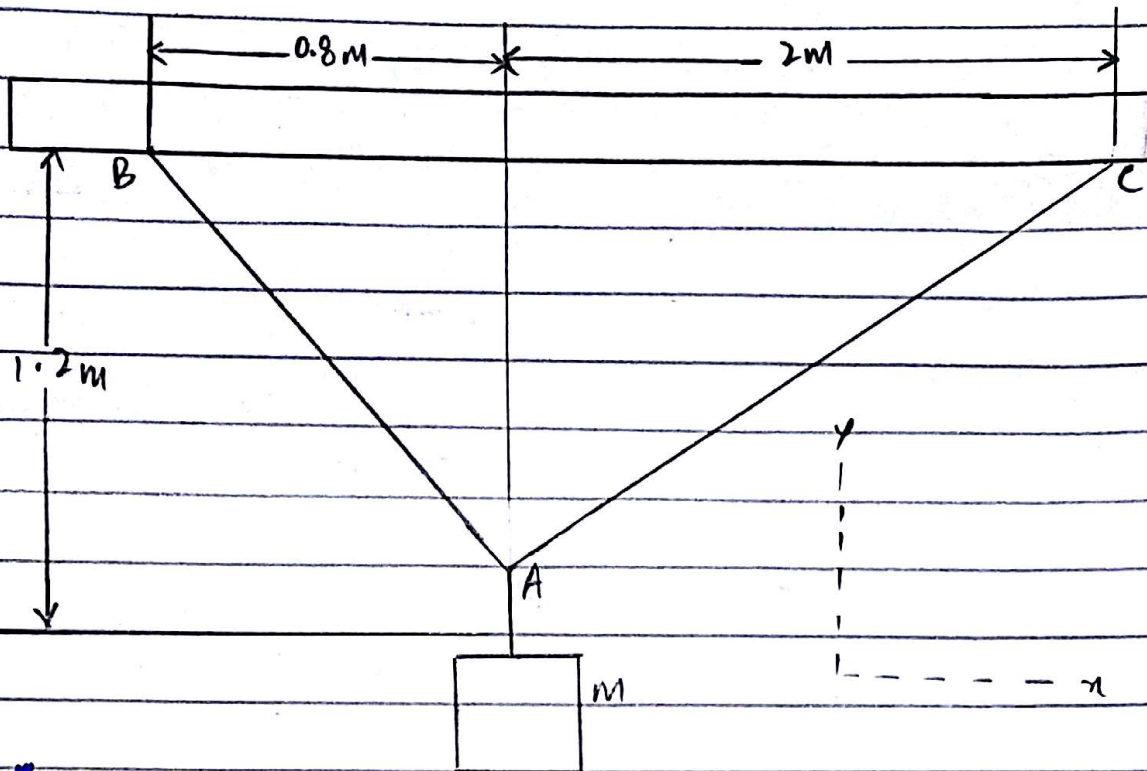
Sec : B

Dept : Civil

Sub : Engineering Mechanics

Teacher : Sir. Majid Naeem

Sign : 

Question No 1 (Part a)\* Solution:

$$\alpha = \tan^{-1} (1.2/0.8) = 56.3^\circ$$

$$\beta = \tan^{-1} (1.2/2) = 31.0^\circ$$

$$\vec{T}_{AB} = T_{AB} - \eta_{AB}$$

$$= 0.858 (60) 9.81 [-\cos 56.3^\circ \hat{i} + \sin 56.3^\circ \hat{j}]$$

$$= -280\hat{i} + 420\hat{j} \text{ N}$$

$$T_{AC} = T_{AC} - M_{AC}$$

$$= 0.555 (60) (9.81) [\cos 31.0^\circ i + \sin 31.0^\circ j]$$

$$= 280 i + 168.1 j \text{ N}$$

Part b:

If increase 15%  
then

$$= 280 \times \frac{15}{100} i + 168.1 \times \frac{15}{100} j$$

$$= 42 i + 25.2 j \text{ increase}$$

and

$$280 \times \frac{15}{100} i + 168.1 \times \frac{15}{100} j$$

$$= 42 i + 25.2 j$$

If increase 35%.

$$= 280 \times \frac{35}{100} i + 168.1 \times \frac{35}{100} j$$

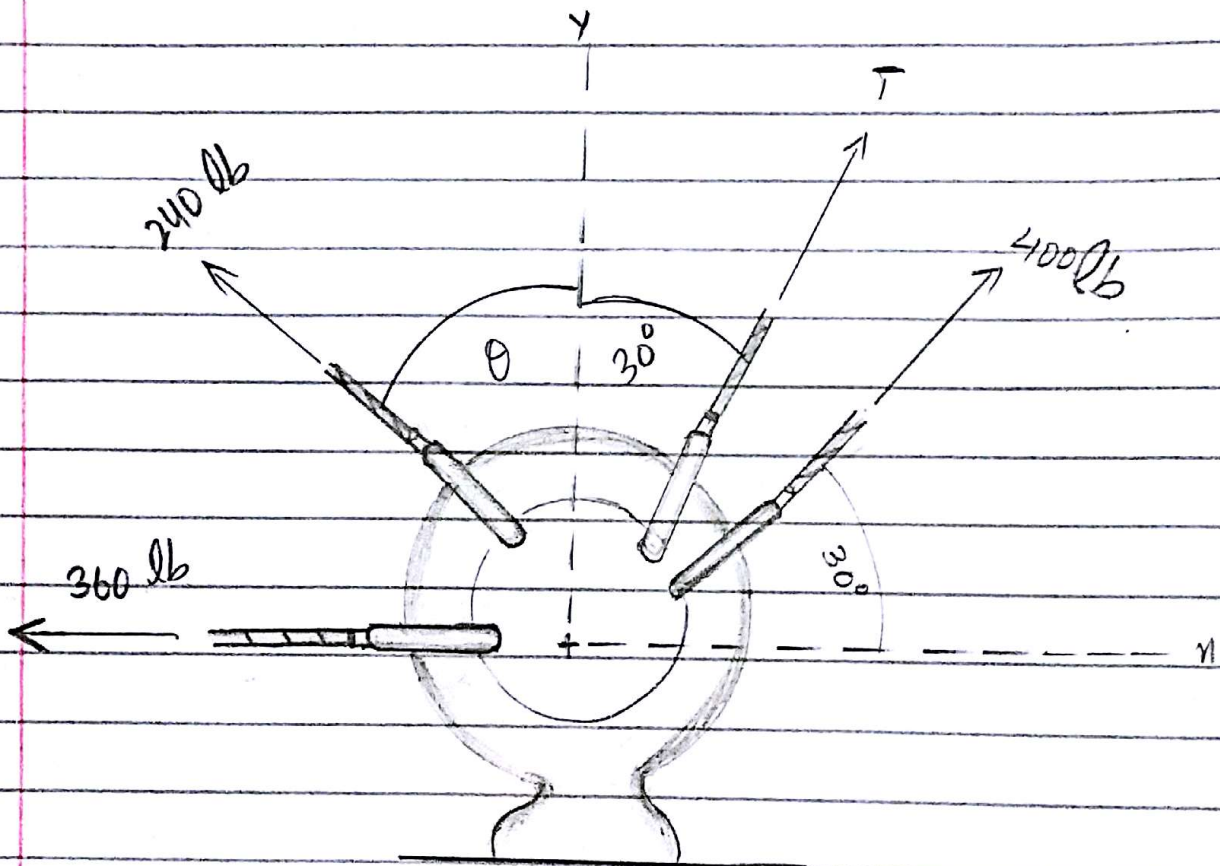
$$= 98 i + 58.8 j$$

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$$- 280 \times \frac{35}{100} i + 168.1 \times \frac{35}{100} j$$

$$= -98 i + 58.8 j$$

Question No 2:



\* Given:

$$F = 600 \text{ lb}$$

\* Required:

$$T = ?$$

$$Q = ?$$

\* Solution:

$$\sum F_x = 0:$$

$$-360 - 240 \sin \theta + T \sin 30^\circ + 40 \cos 30^\circ = 0 \rightarrow (i)$$

$$\sum F_j = 600:$$

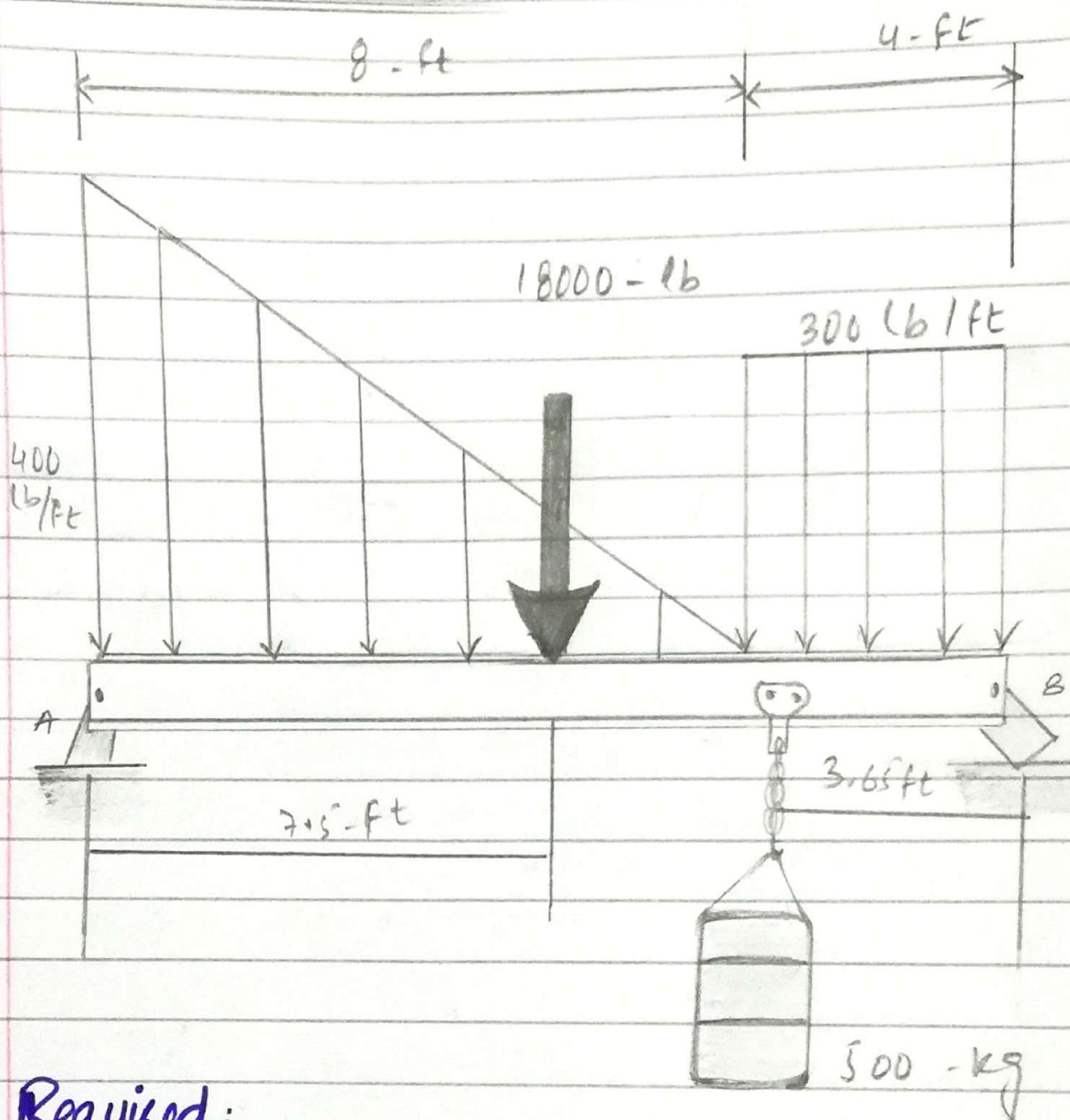
$$240 \cos \theta + T \cos 30^\circ + 400 \sin 30^\circ = 600 \rightarrow (ii)$$

from eq i  $\theta = 21.7^\circ$

from eq ii  $T = 204 \text{ lb}$

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### Question M103:



\* Required:

$$R_A = R_B = ?$$

\* Solution:

$$\text{As, } 500 \text{ kg} = 1102.5 \text{ lb's}$$

$$\sum M_B = 0 \quad \curvearrowright \quad \curvearrowleft$$

$$- (1200 \times 2) - (1102.5 \times 3.65)$$

$$- (1600 \times 9.33) + 12 R_A = 0$$

$$R_A = 1779.34 \text{ lbs}$$

$$\sum F_y = 0 \quad \uparrow \downarrow$$

$$R_A + R_B - 1600 - 1200 - 1102.5 = 0$$

$$R_B = 2123.16 \text{ lbs}$$